National Semiconductor

June 1989

54LS352/DM74LS352 Dual 4-Line to 1-Line Data Selectors/Multiplexers

General Description

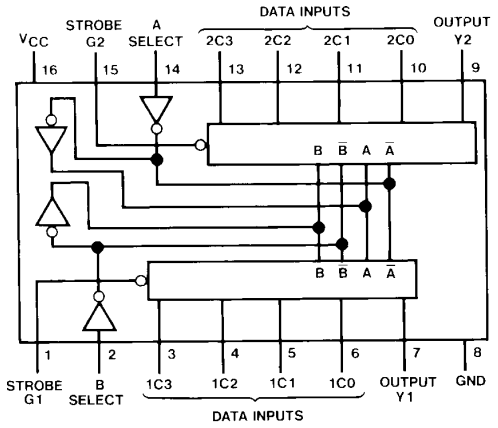
Each of these data selectors/multiplexers contains inverters and drivers to supply fully complementary, on-chip, binary decoding data selection to the AND-OR-invert gates. Separate strobe inputs are provided for each of the two four-line sections.

Features

- Inverting version of DM54/74LS153
- Permits multiplexing from N lines to 1 line
- Performs parallel-to-serial conversion
- Strobe (enable) line provided for cascading (N lines to n lines)
- High fan-out, low-impedance, totem-pole outputs
- Typical average propagation delay times
  - From data 15 ns
  - From strobe 19 ns
  - From select 22 ns
- Typical power dissipation 31 mW

Connection Diagram

Dual-In-Line Package



TL/F/6425–1

Order Number 54LS352DMQB, 54LS352FMQB, DM74LS352M or DM74LS352N
See NS Package Number J16A, M16A, N16E or W16A

Function Table

Select Inputs		Data Inputs				Strobe	Output
B	A	C0	C1	C2	C3	G	Y
X	X	X	X	X	X	H	H
L	L	L	X	X	X	L	H
L	L	H	X	X	X	L	L
L	H	X	L	X	X	L	H
L	H	X	H	X	X	L	L
H	L	X	X	L	X	L	H
H	L	X	X	H	X	L	L
H	H	X	X	X	L	L	H
H	H	X	X	X	H	L	L

Select inputs A and B are common to both sections.

H = High Level, L = Low Level, X = Don't Care

RRD-B30M105/Printed in U. S. A.

Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
54LS	−55° C to +125°C
DM74LS	0° C to +70°C
Storage Temperature Range	−65° C to +150° C

Note: *The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.*

Recommended Operating Conditions

Symbol	Parameter	54LS352			DM74LS352			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.7			0.8	V
I_{OH}	High Level Output Current			−0.4			−0.4	mA
I_{OL}	Low Level Output Current			12			8	mA
T_A	Free Air Operating Temperature	−55		125	0		70	°C

Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ (Note 1)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.5	V
V_{OH}	High Level Output Voltage	V_{CC} = Min, I_{OH} = Max, V_{IL} = Max, V_{IH} = Min	54LS	2.5			V
			DM74	2.7	3.4		
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IL} = Max, V_{IH} = Min	54LS			0.4	V
			DM74		0.35	0.5	
		I_{OL} = 4 mA, V_{CC} = Min	DM74		0.25	0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 10V	54LS			0.1	mA
		V_{CC} = Max, V_I = 7V	DM74				
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.7V				20	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.4V				−0.4	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 2)	54LS	−20		−100	mA
			DM74	−20		−100	
I_{CC}	Supply Current	V_{CC} = Max (Note 3)			6.2	10	mA

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

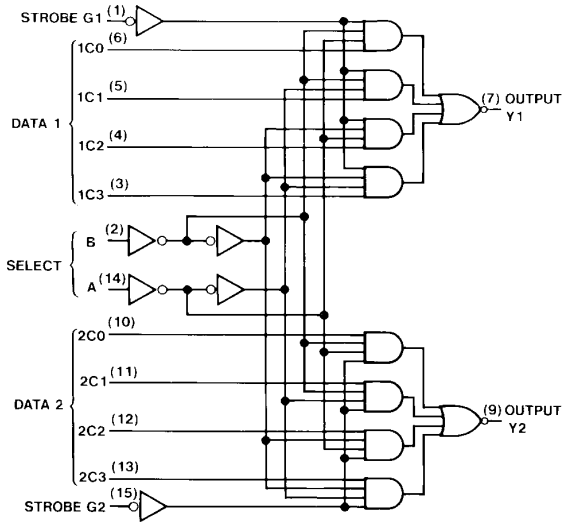
Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I_{CC} is measured with all outputs open and all other inputs at ground.

Switching Characteristics at $V_{CC} = 5V$ and $T_A = 25°C$ (See Section 1 for Test Waveforms and Output Load)

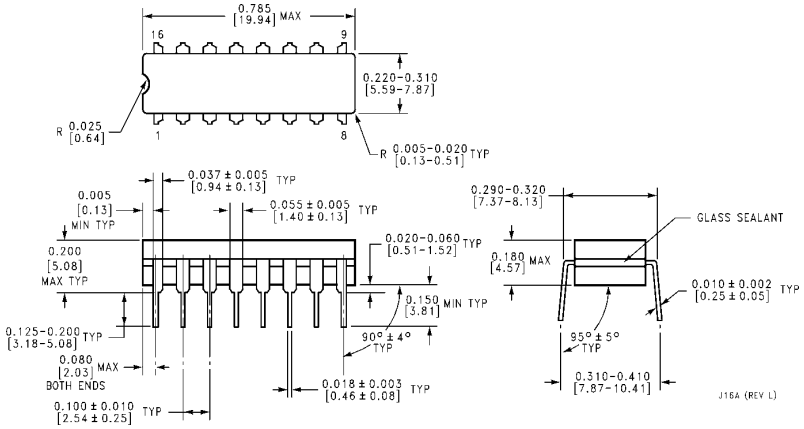
Symbol	Parameter	From (Input) To (Output)	54LS		DM74LS		Units
			$C_L = 15$ pF		$C_L = 50$ pF, $R_L = 2$ kΩ		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	Data to Y		12		24	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Data to Y		12		35	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	Select to Y		22		33	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Select to Y		38		47	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	Strobe to Y		15		29	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Strobe to Y		20		41	ns

Logic Diagram

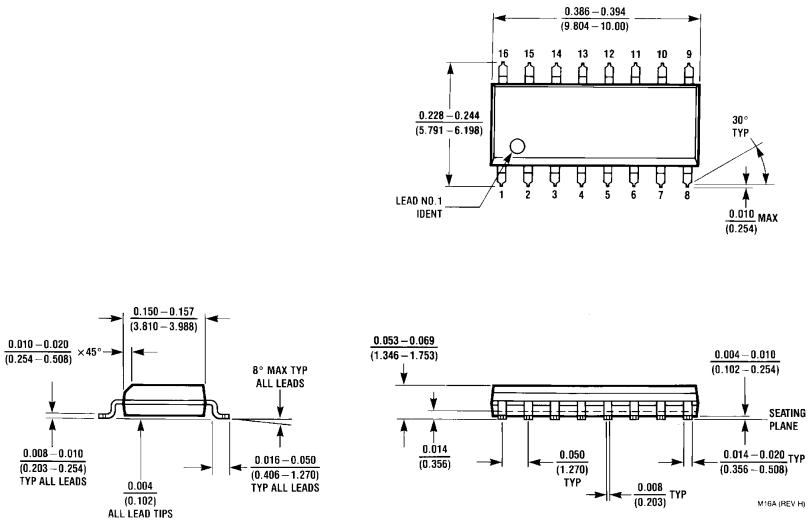


TL/F/6425–2

Physical Dimensions inches (millimeters)

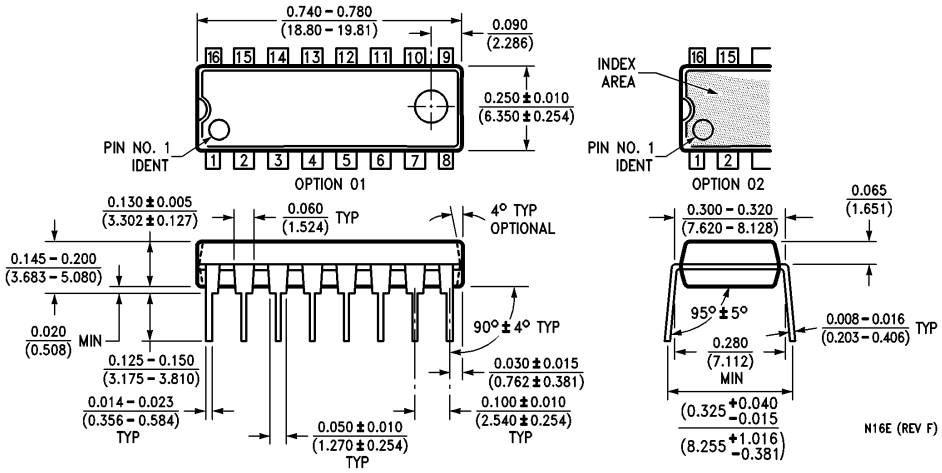


16-Lead Ceramic Dual-In-Line Package (J)
Order Number 54LS352DMQB
NS Package Number J16A



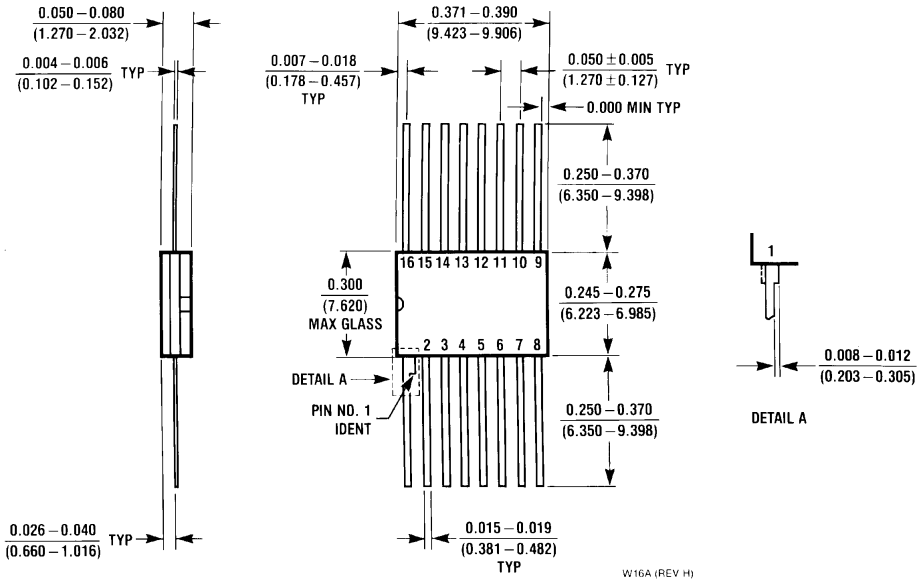
16-Lead Small Outline Molded Package (M)
Order Number DM74LS352M
NS Package Number M16A

Physical Dimensions inches (millimeters) (Continued)



16-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS352N
NS Package Number N16E

Physical Dimensions inches (millimeters) (Continued)



16-Lead Ceramic Flat Package (W)
Order Number 54LS352FMQB
NS Package Number W16A

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